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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/520,125

01/03/2005

Shigeki Yamate

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EXAMINER

ENIN-OKUT, EDU E

ART UNIT

PAPER NUMBER

4132

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/520,125	Applicant(s) YAMATE, SHIGEKI	
	Examiner Edu E. Enin-Okut	Art Unit 4132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/3/05, 8/8/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of Applicant's claim for foreign priority to Japanese Patent Application Nos. 2003-083921 (filed on March 25, 2003) and 2002-196420 (filed on July 4, 2002), under 35 U.S.C. 119(a)-(d). It is noted, however, that applicant has not filed a certified copy of those application as required by 35 U.S.C. 119(b).

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-4 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimamura et al. (U.S. Patent No. 6,090,505) in view of Ehrlich (U.S. Patent Application No. 2003/0064291).

Additional supporting evidence is provided by M. N. Rahaman, *Ceramic Processing and Sintering*, Second Edition, 2003.

Regarding claim 1, Shimamura teaches a non-aqueous electrolyte secondary battery (Title; Abstract) comprising:

- a negative electrode with a composite layer containing a negative active material (Abstract; 5:9-13, 5:20-25);
- a positive electrode [metal lithium electrode] (5:14-17, 7:12-17); and
- a non-aqueous electrolyte [organic electrolyte] (5:17-19, 14:13-14); and,
- characterized in that said negative active material is an alloy [solid phase A + solid phase B]; and
- said alloy contains Sn_4Ni_3 phase [solid phase B] and Sn phase [solid phase A, Ni_3Sn_2] (Sample 66 on Tables 2(A) - 2(B)).

Shimamura does not explicitly teach that the alloy contains 5 to 25 mass % of nickel and 75 to 95 mass % of tin.

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However, the reference does teach the alloy having a 27 mass % of Ni and 73 mass % of Sn which showed a sustainable high charge-discharge capacity and, in turn, excellent cycle characteristics (Sample 66, Table 2(B), 8:48-53).

Ehrlich teaches a negative electrode material for a lithium-ion electrochemical cell, made of a mixture of 5 to 90 wt. % nickel particles and 10 to 95 wt. % tin particles, with improved cell capacity and cycle life performance (Abstract; para. 9).

It has been held that obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties (e.g., *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)). See MPEP 2144.05 (I). Also, the courts have held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum ranges by routine experimentation (e.g., *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)). See MPEP 2144.05 (IIA).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the alloy of Shimamura in view of Ehrlich in the negative electrode of the non-aqueous battery of Shimamura, with the mass percentages of those components as recited in claim 1, because an alloy of this composition is known in the art to produce a negative electrode that increases battery reliability, safety, cycle performance, capacity and charge-discharge characteristics (see Shimamura, Abstract).

Regarding claim 2, Shimamura teaches that the content ratio of said Sn_4Ni_3 phase and said Sn phase in said alloy is $0.7 \leq Z \leq 19$ when m_1 is the mass of said Sn_4Ni_3 phase [40-95%], m_2 is the mass of said Sn phase [5-60%], and $Z=m_1/m_2$ (Claim 7).

Since it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art where the general conditions of a claim are disclosed in the prior art (e.g.,

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In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)), and it is not inventive to discover the optimum ranges by routine experimentation, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the alloy of Shimamura in the non-aqueous battery of Shimamura, as modified by Ehrlich, with a content ratio as recited in claim 1 for the reasons recited above. See MPEP 2144.05 (I) and (VI).

Regarding claim 3, Shimamura teaches that the composite layer contains carbon material [acetylene black] (5:20-25). It is noted that Applicant discloses an acetylene black as an example of a graphitic carbon material on p. 7, line 2.

Regarding claim 4, as to the composite layer containing a carbon material, this limitation has been addressed above with respect to claim 3.

As to when n_1 is the mass of the alloy, n_2 is the mass of said carbon material, and $S=n_1/n_2$, S falls within the range of $0.05 \leq S \leq 3.5$, Shimamura teaches a negative electrode material paste formed from 85 wt. % negative material powder, 10 wt. % binder and 5 wt. % conductive agent of acetylene black (5:20-25). The reference also teaches that the conductive agent, i.e., a carbon powder, can be varied from 5-80 wt. % (15:1-5; Claim 24).

If the amount of the binder of Shimamura remains approximately the same as the amount of its carbon powder in the negative electrode material paste is varied, and the amount of the negative material powder is varied accordingly, the S values taught by Shimamura is approximately from 0.0125 to 17.

Since it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art where the general conditions of a claim are disclosed in the prior art, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the alloy of Shimamura in the non-aqueous battery of Shimamura, as modified by Ehrlich, with an S value as recited in claim 4, to produce a battery with sustainable high discharge capacity and prevent the lowering of its electron conductivity and cycle characteristics (see Shimamura, 15:6-13).

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Regarding claims 8-10, Shimamura in view of Ehrlich teaches a negative electrode material density of greater than about 5 g/ml found using helium pycnometry (see Ehrlich, Abstract, para. 37). One of ordinary skill would appreciate is 5 g/ml is equivalent to 5 g/cm³ and that helium pycnometry is well known in the art as a method used to determine the apparent density of a material (see M. N. Rahaman, *Ceramic Processing and Sintering*, Second Edition, p. 156).

7. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimamura et al. and Ehrlich as applied to claims 1-4 above, further in view of Tsutsue et al. (U.S. Patent Application No. 2002/0006548).

Shimamura and Ehrlich are applied and incorporated herein for the reasons above.

Regarding claim 5, as to the composite layer using a powdered negative active material, this limitation has been addressed above with respect to claim 4.

As to the porosity of the composite layer being 30 to 75%, Tsutsue teaches that a thin, light-weight polymer electrolyte battery of high capacity density can be produced by optimizing the porosity of a layer of electrode active material mixture containing a polymer (Abstract; para. 12). The preferred porosity of the layer of negative electrode active material is from 35 to 45% (para. 18). The amount of polymer in the negative electrode active material mixture ranges from 7 to 16 wt. % (para. 21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the porosity of the composite layer of Shimamura, as modified by Ehrlich, to obtain a layer having a porosity in the range as recited by claim 5, as taught by Tsutsue, to produce a battery that is thin, light-weight and has a high capacity density.

Correspondence / Contact Information

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edu E. Enin-Okut whose telephone number is 571-270-3075. The examiner can normally be reached on Monday-Thursday, 8 a.m. - 4 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward, can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E Enin-Okut/
Examiner, Art Unit 4132

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 4132